**LPG Static Vessel Standard**

**2 Te Wefco Above Ground / Under Ground**

## 1: Manufacturing Standards and Specifications:

**Vessel Design**
Designed and manufactured in accordance with the requirements of BS EN 12452: 2010

**Design Temperature**
$-40^0$ C to $+48^0$ C

**Maximum Design Pressure**
18.5 bar

**Test Pressure**
26.5 bar

**Vacuum Rating**
Full Vacuum

**Operating Medium**
Liquefied gases acc. BS4250 / EN 589

**Valves and Fittings**
Standard free issue valves (SRG) installed and tested for leaks in accordance with section 3

**Water Capacity**
4,600 Litres

**Documentation**
According to BS EN 12542: 2010. Fabrication drawing appended to specification document

## 2. Surface Preparation, Paint Finish and Data Plate:

### 2.1 Surface Preparation

All welding spatter and welding slag must be removed immediately after blasting.
Round off sharp edges and drill holes to a radius of 2 to 3 millimetres.
Before blasting, the surface must be free of oil and grease to minimize the risk of poor adhesion, particularly in the case of an automatic blasting processes.

Tank exterior surface to be shot blasted to SA 2 ½.
After blasting thoroughly remove dust and blasting medium by compressed air.

**2.2 Optional Vessel Paint systems:**

| | Above Ground System | Underground System |
|---|---|---|
| **Coat 1** | Sherwin Williams Fast Clad 7220 – 75 microns | International Interzone 954 – 500 microns |
| **Coat 2** | Sherwin Williams Acrolon 1850 – 75 microns | N/A |
| **Final Colour** | BS 4800 12-B-21 Westmorland Green | BS 4800 08-E-56 Yellow Ocre |

**Vessel Corrosion Protection System**

Vessels may be fitted with a Sacrificial Anode corrosion protection system. The Anodes are to be connected to the vessel via a connection box mounted within the valve chamber, the connection box shall incorporate suitable switches or other means to facilitate the testing of the system.

**3.1: SRG Valves and Fittings – ABOVE GROUND**

| Nozzle Reference | Size | Part Number | Description |
|---|---|---|---|
| **N1** | **1¼" NPT** | SRG 485-415-2005 (2 Required) 485-810-3001 & 485-427-2007 | Pressure Relief Valve and Check Valve Assembly (set pressure 17.0 bar) |
| **N2** | **Pad** | SRG 487-987-1004 | Float Gauge |
| **N3** | **1¼" NPT** | SRG 481-453-1002 | Auto-stop Fill Valve with manual isolation (angled) |
| **N4** | **¾" NPT** | SRG 483-435-1101 | Vapour service valve |
| **N5** | **¾" NPT** | SRG 480-435-1001 | Liquid Drain Check Lock Valve |
| **N6** | **1¼" NPT** | - | 1¼" NPT Hex plug (galvanised) |
| **N7** | **1¼" NPT** | - | 1¼" NPT Hex plug (galvanised) |

**3.2: SRG Valves and Fittings – UNDER GROUND**

| Nozzle Reference | Size | Part Number | Description |
|---|---|---|---|
| **N1** | **1¼" NPT** | SRG 485-415-2005 485-810-3001 & 485-427-2007 | Pressure Relief Valve and Check Valve Assembly (set pressure 17.0 bar) |
| **N2** | **Pad** | SRG 487-911-1008 | Float Gauge Brass Head |
| **N3** | **1¼" NPT** | SRG 481-452-1006 | Auto-stop Fill Valve with manual isolation L410 (straight) |
| **N4** | **¾" NPT** | SRG 483-435-1101 | Vapour service valve |
| **N5** | **¾" NPT** | SRG 480-435-1001 | Liquid Drain Check Lock Valve |

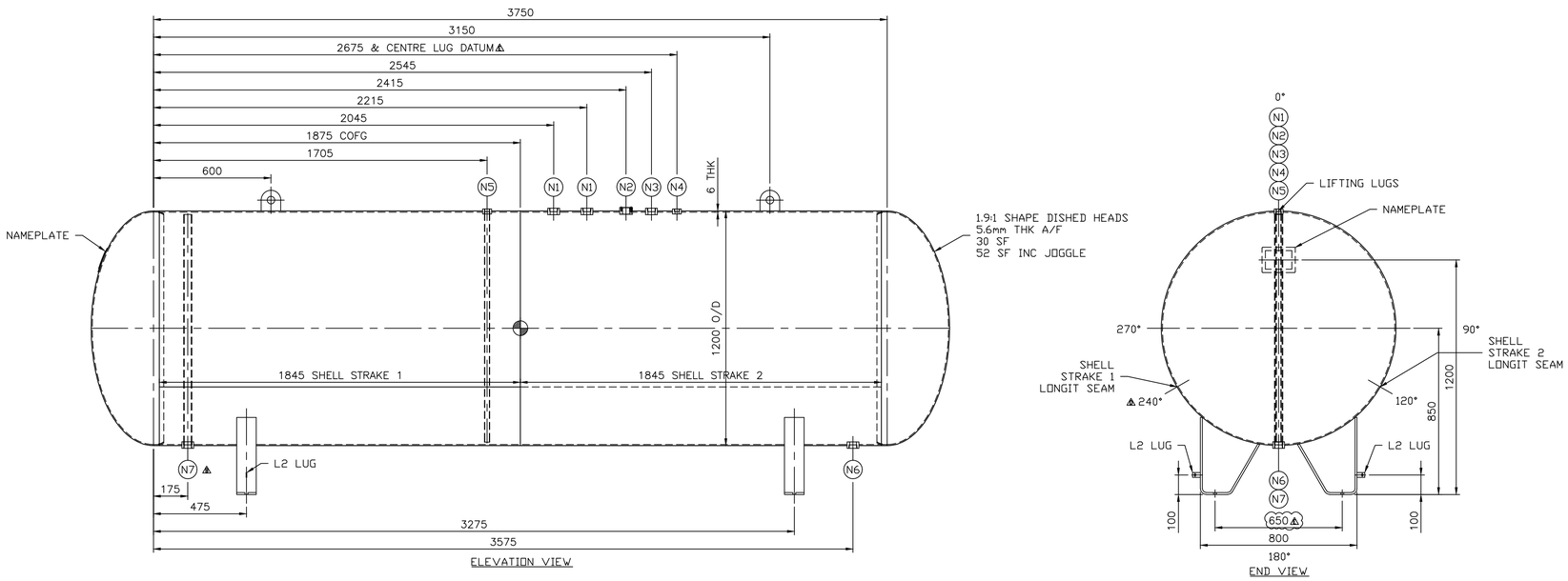
**4: Testing**

All Vessels shall be hydraulically tested in accordance with BS EN 12542.
Longitudinal & circumferential seam to be inspected using Phased Array Ultrasonic Test methods (PAUT). Exact % of weld & locations to be in accordance with BS EN 12542

10% MPI inspection on socket / attachment welds

100% MPI inspection on lifting lug welds

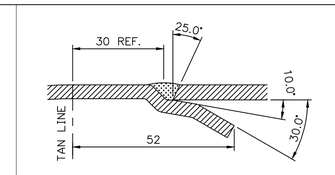
Max 6 BarG pneumatic air test post painting & valve install to check for leaks.
Duration of test to be sufficient to allow for all welds & threaded connections to be examined with suitable detector fluid.



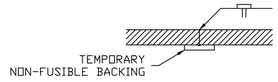

ELEVATION VIEW



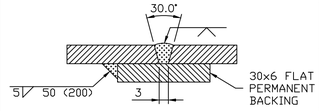

END VIEW




HEAD TO SHELL JOGGLE WELD DETAIL




SHELL LONGIT & CENTRE CIRC SEAM WELD DETAIL




SHELL CENTRAL CIRC SEAM WELD DETAIL ⚠

## CODE & SPECIFICATIONS

BS EN 12542: 2010⚠
PESSR 2016 - CAT IV
APPROVED BODY: LLOYDS REGISTER

| | PRESSURE INT/EXT | TEMPERATURE |
|---|---|---|
| VESSEL DESIGN | +18.5 BARG / FV | -40°C / +48°C |

| | |
|---|---|
| CORROSION ALLOWANCE | NONE |
| INSULATION | NONE |
| PWHT | NONE |
| JOINT EFFICIENCY | 1 |
| VOLUME | 4.6 m3 |
| CONTENTS | LPG |

| | FABRICATED | ERECTED | TEST | OPERATING |
|---|---|---|---|---|
| WEIGHT (kg) | 860 | 860 | 5477 | 3649 |

## MATERIALS OF CONSTRUCTION

| | |
|---|---|
| SHELL | BS EN 10028-2 P295 GH |
| DISHED HEADS | BS EN 10028-3 P355 N |
| CONNECTIONS | SA 350 LF2 (CLASS 1) |
| NOZZLE NECKS (INTERNAL) | SA 333 GR 6 |
| PRESSURE PART ATTACHMENTS | BS EN 10025-2 S275 J0 |
| FIXING STUDS | ISO 3506 Gr A2-70 |
| NAMEPLATE | SA 240 304L |

## NOTES

1. ALL WELDS AS PER DETAILS
2. ALL ELEVATIONS ARE TAKEN FROM DISH TANLINE
3. FLANGE BOLT HOLES TO STRADDLE VESSEL CTRS U.N.O.
4. ALL PLATE EDGES & INTERIOR OF HOLES TO BE RADUSED TO A MINIMUM OF 2mm
5. ALL LOOSE MATTER, WELD SPATTER, WELD SLAG, SCALE ETC. IS REMOVED FROM THE INSIDE OF THE VESSEL BEFORE SHELL CLOSURES
6. ALL CONNECTIONS TO BE PROVIDED WITH SERVICE VALVES, GAUGES OR PLUGS FOR TRANSIT
7. TANK TO BE TRANSPORTED UNDER VACUUM CONDITIONS

## RADIOGRAPHY / UT REQUIREMENTS

10% LONGITUDINAL SEAMS AFTER SATISFACTORY EXPERIENCE GAINED**
10% CIRCUMFERENTIAL SEAMS
100% SHELL T-JUNCTIONS

**100% LONGITUDINAL SEAMS BEFORE SATISFACTORY EXPERIENCE GAINED

SATISFACTORY EXPERIENCE DEFINED AS PER BS EN 12542 9.2.2

## MPI REQUIREMENTS

10% MPI NOZZLE/SOCKET WELDS
10% ATTACHMENT WELDS

## PRESSURE TESTING

| | SHOP TEST PRESSURE |
|---|---|
| HYDROSTATIC - 10 MINS HOLD TIME | +26.5 BARG |

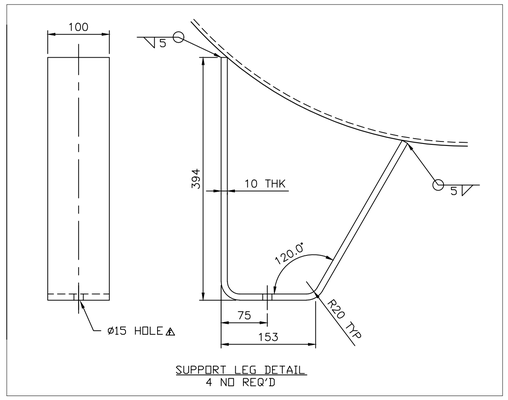
## SURFACE FINISH

INTERNAL:
SELF COLOUR, SWEPT CLEAN, DRY & GREASE FREE

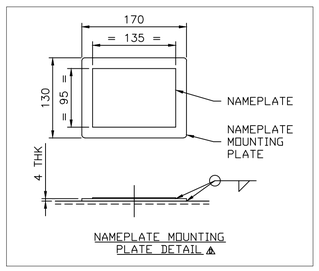
EXTERNAL:
SHOT BLAST TO SA 2.5 & APPLY:
ONE COAT SW FAST CLAD 7220 @ 75 MICRONS DFT MIN
ONE COAT SW ACROLON 1850 @ 75 MICRONS DFT MIN

FINAL COLOUR: BS 4800 00-E-55 WHITE ⚠

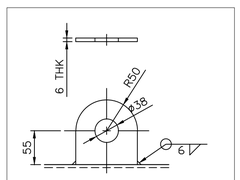
3RD ANGLE PROJECTION



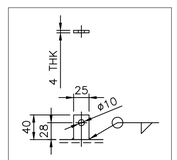

SUPPORT LEG DETAIL
4 NO REQ'D



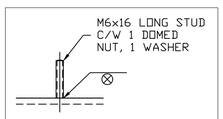

NAMEPLATE MOUNTING PLATE DETAIL ⚠



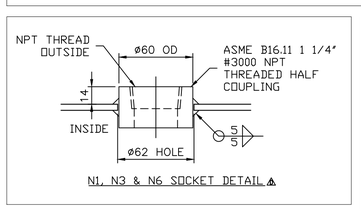

LIFTING LUG DETAIL
2 NO REQ'D



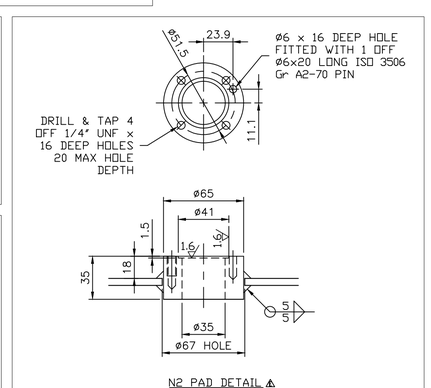

L2 EARTHING LUG DETAIL
2 NO REQ'D



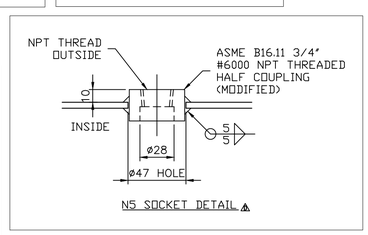

FIXING STUD DETAIL
8 NO REQ'D



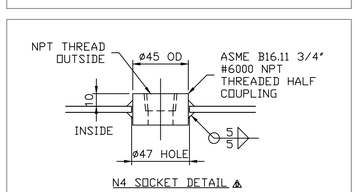

N1, N3 & N6 SOCKET DETAIL ⚠



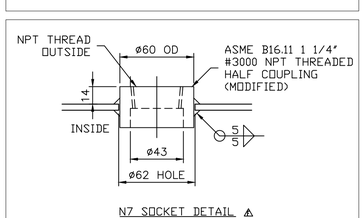

N2 PAD DETAIL ⚠



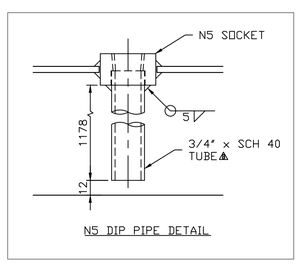

N5 SOCKET DETAIL ⚠



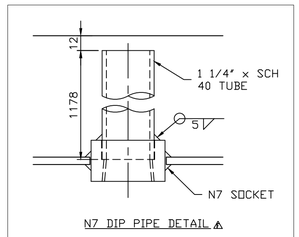

N4 SOCKET DETAIL ⚠



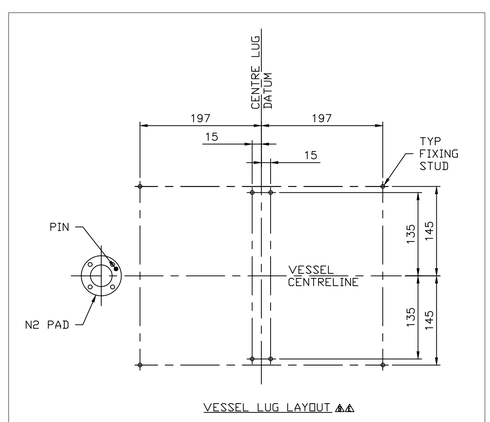

N7 SOCKET DETAIL ⚠




N5 DIP PIPE DETAIL




N7 DIP PIPE DETAIL ⚠




VESSEL LUG LAYOUT ⚠⚠

| | | | | | | |
|---|---|---|---|---|---|---|
| N7 | 1 | 1 1/4" | #3000 NPT | VAPOUR SERVICE (BTM) | 60 O/D x 8.9 THK ⚠ | C/W B16.11 1 1/4" HEX PLUG (GALV) & INTERNAL TUBE |
| N6 | 1 | 1 1/4" | #3000 NPT | DRAIN | 60 O/D x 8.9 THK ⚠ | C/W B16.11 1 1/4" HEX PLUG (GALV) |
| N5 | 1 | 3/4" | #6000 NPT | LIQUID DRAIN | 44.9 O/D x 9.1 THK⚠ | C/W SRG TYPE 480 VALVE & INTERNAL TUBE |
| N4 | 1 | 3/4" | #6000 NPT | VAPOUR SERVICE | 44.9 O/D x 9.1 THK⚠ | C/W SRG TYPE 483 VALVE |
| N3 | 1 | 1 1/4" | #3000 NPT | FILL CONNECTION | 60 O/D x 8.9 THK ⚠ | C/W SRG TYPE 481 VALVE |
| N2 | 1 | N/A | CUSTOM PAD | CONTENTS GAUGE | 65 O/D x 15 THK | C/W SRG TYPE 487 FLOAT GAUGE, BOLTING & GASKET |
| N1 | 2 | 1 1/4" | #3000 NPT | PRESSURE RELIEF VALVE | 60 O/D x 8.9 THK ⚠ | C/W SRG TYPE 485 PRV, SEALING RING & CHECK VALVE |
| REF. | QTY. | SIZE | RATING | SERVICE | NECK | REMARKS |

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| G | 13/08/21 | P.A. | PESR UPDATED |
| F | 16/11/20 | P.A. | N7 INCREASED, HD BOLT HOLES ADDED |
| E | 06/10/20 | P.A. | FLOAT PAD PIN ORIENTATION & PINS |
| D | 25/08/20 | P.A. | SOCKET OD, LONGIT SEAM, NAMEPLATE |
| C | 30/07/20 | P.A. | PAINT |
| B | 30/06/20 | P.A. | UPDATED INLINE WITH CLIENT COMMENTS |

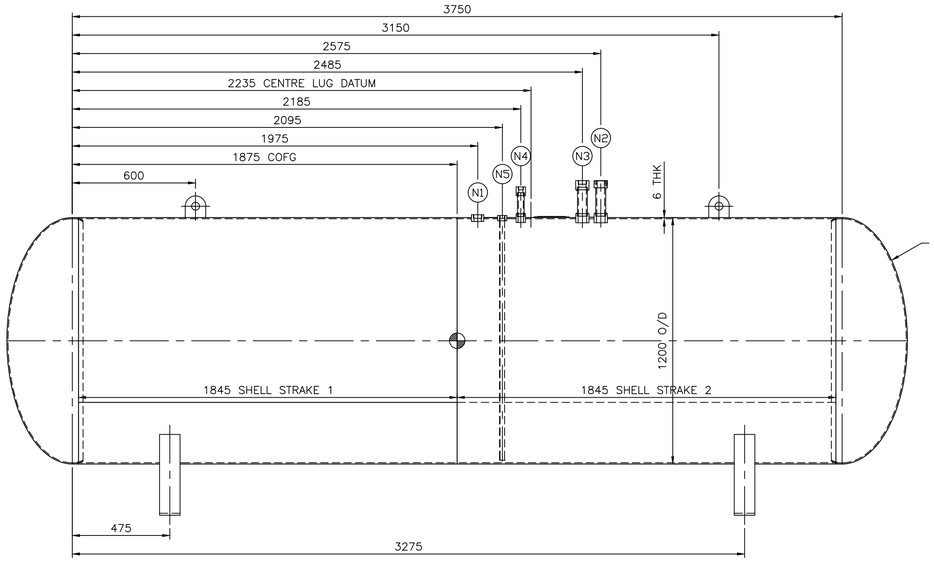
wefco
Britannia Works
Station Approach
Gainsborough
DN21 2AU
Tel. 01427 611000

**FLOGAS BRITAIN LTD**

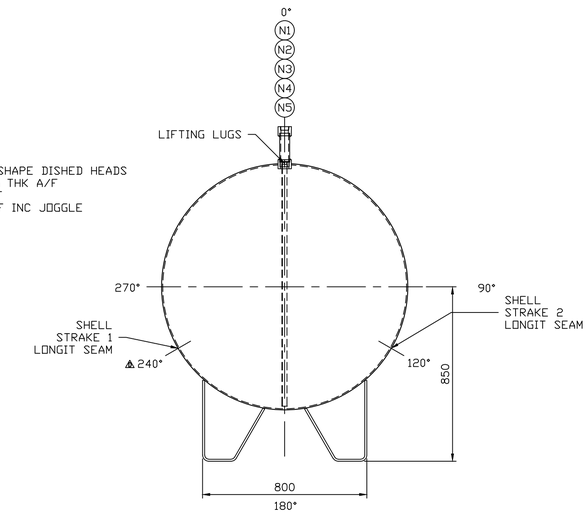
**2000KG ABOVE GROUND LPG VESSEL GENERAL ARRANGEMENT**

| | | | |
|---|---|---|---|
| Scale | 1:15 | | A1 |
| Drawn | P.A. | Chkd. | D.A. |
| Date | 14/05/20 | Mat'l. | SEE M.O.C. |

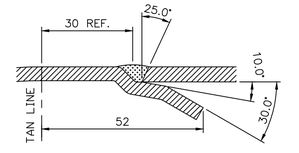
Drg.No. WEF-LPG-AG-2000-01 | Rev. G



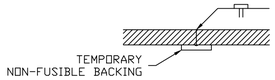

ELEVATION VIEW



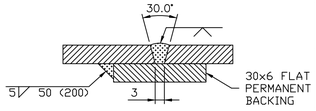

END VIEW




HEAD TO SHELL JOGGLE WELD DETAIL




SHELL LONGIT SEAM WELD DETAIL




SHELL CENTRAL CIRC SEAM WELD DETAIL ⚠

## CODE & SPECIFICATIONS

BS EN 12542: 2010⚠
PESSR 2016 - CAT IV
APPROVED BODY: LLOYDS REGISTER

| | PRESSURE INT/EXT | TEMPERATURE |
|---|---|---|
| VESSEL DESIGN | +18.5 BARG / FV | -40°C / +48°C |

| | |
|---|---|
| CORROSION ALLOWANCE | NONE |
| INSULATION | NONE |
| PWHT | NONE |
| JOINT EFFICIENCY | 1 |
| VOLUME | 4.6 m3 |
| CONTENTS | LPG |

| | FABRICATED | ERECTED | TEST | OPERATING |
|---|---|---|---|---|
| WEIGHT (kg) | 860 | 860 | 5477 | 3649 |

## MATERIALS OF CONSTRUCTION

| | |
|---|---|
| SHELL | BS EN 10028-2 P295 GH |
| DISHED HEADS | BS EN 10028-3 P355 N |
| CONNECTIONS | SA 350 LF2 (CLASS 1) |
| NOZZLE NECKS | SA 333 GR 6 |
| PRESSURE PART ATTACHMENTS | BS EN 10025-2 S275 J0 MIN |
| FIXING STUDS | ISO 3506 Gr A2-70 |
| NAMEPLATE | SA 240 304L |

## NOTES

1. ALL WELDS AS PER DETAILS
2. ALL ELEVATIONS ARE TAKEN FROM DISH TANLINE
3. FLANGE BOLT HOLES TO STRADDLE VESSEL CTRS U.N.O.
4. ALL PLATE EDGES & INTERIOR OF HOLES TO BE RADUSED TO A MINIMUM OF 2mm
5. ALL LOOSE MATTER, WELD SPATTER, WELD SLAG, SCALE ETC. IS REMOVED FROM THE INSIDE OF THE VESSEL BEFORE SHELL CLOSURES
6. ALL CONNECTIONS TO BE PROVIDED WITH SERVICE VALVES, GAUGES OR PLUGS FOR TRANSIT
7. TANK TO BE TRANSPORTED UNDER VACUUM CONDITIONS

## RADIOGRAPHY / UT REQUIREMENTS

10% LONGITUDINAL SEAMS AFTER SATISFACTORY EXPERIENCE GAINED**
10% CIRCUMFERENTIAL SEAMS
100% SHELL T-JUNCTIONS

**100% LONGITUDINAL SEAMS BEFORE SATISFACTORY EXPERIENCE GAINED

SATISFACTORY EXPERIENCE DEFINED AS PER BS EN 12542 9.2.2

## MPI REQUIREMENTS

10% MPI NOZZLE/SOCKET WELDS
10% ATTACHMENT WELDS

## PRESSURE TESTING

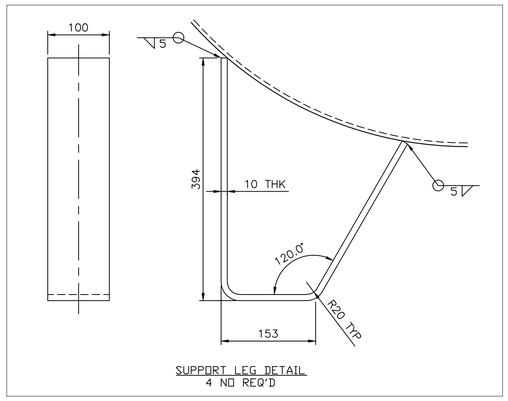
| | SHOP TEST PRESSURE |
|---|---|
| HYDROSTATIC - 10 MINS HOLD TIME | +26.5 BARG |

## SURFACE FINISH

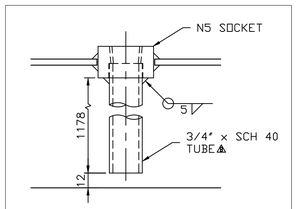
INTERNAL:
SELF COLOUR, SWEPT CLEAN, DRY & GREASE FREE

EXTERNAL:
SHOT BLAST TO SA 2.5 & APPLY:
ONE COAT INTERNATIONAL INTERZONE 954 @ 500 MICRONS DFT MIN

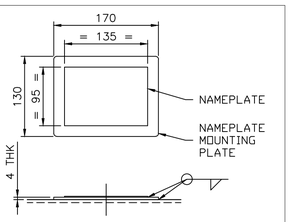
FINAL COLOUR: BS 4800 08-E-56 YELLOW OCRE⚠⚠



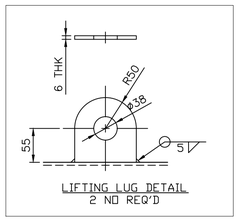

SUPPORT LEG DETAIL
4 NO REQ'D



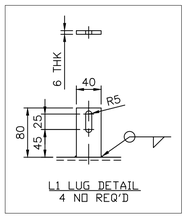

N5 DIP PIPE DETAIL



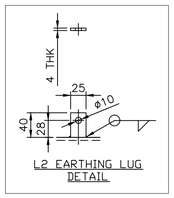

NAMEPLATE MOUNTING
PLATE DETAIL⚠



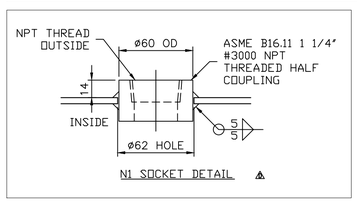

LIFTING LUG DETAIL
2 NO REQ'D



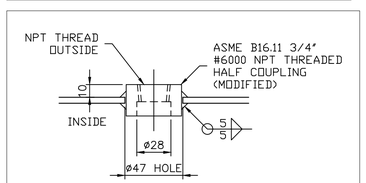

L1 LUG DETAIL
4 NO REQ'D



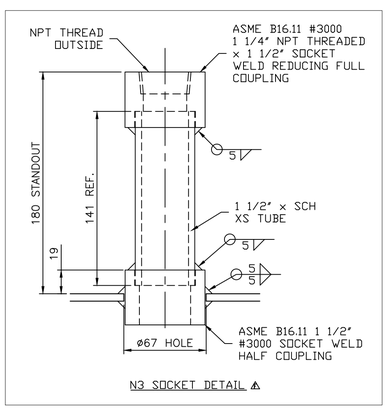

L2 EARTHING LUG
DETAIL



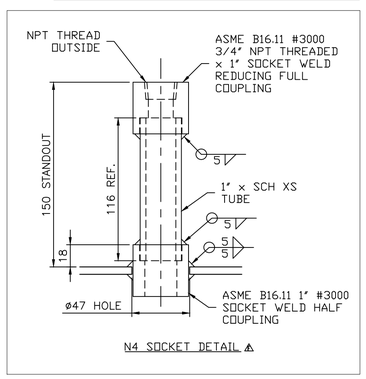

N1 SOCKET DETAIL ⚠



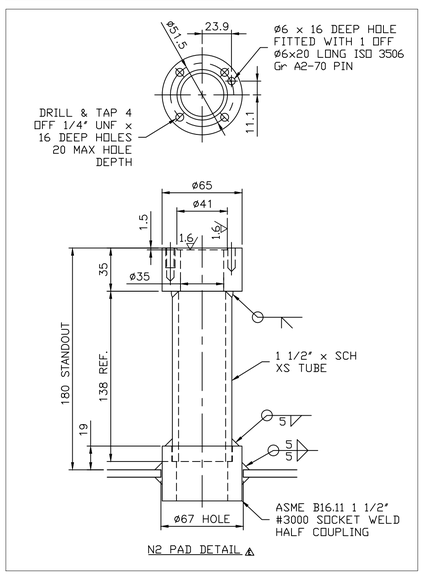

N5 SOCKET DETAIL ⚠



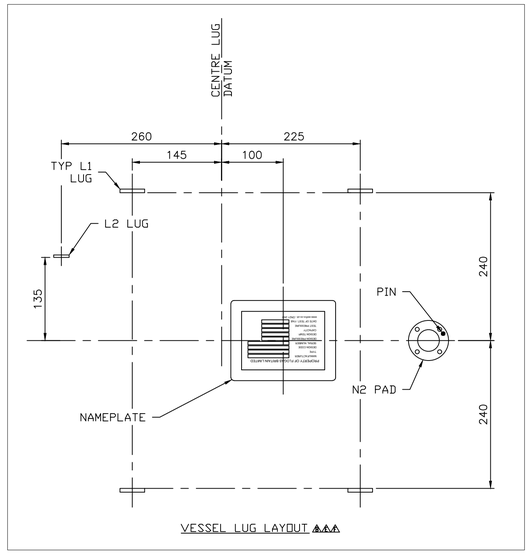

N3 SOCKET DETAIL ⚠




N4 SOCKET DETAIL ⚠




N2 PAD DETAIL ⚠




VESSEL LUG LAYOUT ⚠⚠⚠

| REF. | QTY. | SIZE | RATING | SERVICE | NECK | REMARKS |
|---|---|---|---|---|---|---|
| N5 | 1 | 3/4" | #6000 NPT | LIQUID DRAIN | 44.9 O/D x 9.1 THK ⚠ | C/W SRG TYPE 480 VALVE & INTERNAL TUBE |
| N4 | 1 | 3/4" | #3000 NPT ⚠ | VAPOUR SERVICE | 44.9 O/D x 5.75 THK ⚠ | C/W SRG TYPE 483 VALVE |
| N3 | 1 | 1 1/4" | #3000 NPT | FILL CONNECTION | 64.8 O/D x 7.8 THK ⚠ | C/W SRG TYPE 481 VALVE |
| N2 | 1 | N/A | CUSTOM PAD | CONTENTS GAUGE | 64.8 O/D x 7.8 THK ⚠ | C/W SRG TYPE 487 FLOAT GAUGE, BOLTING & GASKET |
| N1 | 1 | 1 1/4" | #3000 NPT | PRESSURE RELIEF VALVE | 60 O/D x 8.9 THK ⚠ | C/W SRG TYPE 485 PRV, SEALING RING & CHECK VALVE |

3RD ANGLE PROJECTION

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| G | 13/08/21 | P.A. | PESR UPDATED |
| F | 24/11/20 | P.A. | N3, N4 SOCKET INCREASE, CHAMBER LUGS |
| E | 30/09/20 | P.A. | FLOAT PAD PIN ORIENTATION, PAINT |
| D | 25/08/20 | P.A. | SOCKET OD, LONGIT SEAM, NAMEPLATE |
| C | 30/07/20 | P.A. | SOCKETS & PAINT |
| B | 30/06/20 | P.A. | UPDATED INLINE WITH CLIENT COMMENTS |

wefco
Britannia Works
Station Approach
Gainsborough
DN21 2AU
Tel. 01427 611000

**FLOGAS BRITAIN LTD**

# 2000KG UNDER GROUND LPG VESSEL GENERAL ARRANGEMENT

| | | | |
|---|---|---|---|
| Scale | 1:15 | | A1 |
| Drawn | P.A. | Chkd. | D.A. |
| Date | 14/05/20 | Mat'l. | SEE M.O.C. |

**Drg.No. WEF-LPG-UG-2000-02** Rev. G